REQUEST FOR PROPOSALS

UTAH DEPARTMENT OF TRANSPORTATION

I-15 CORE

Project No. MP-I15-6(178)245

PART TWO: GENERAL REQUIREMENTS

June 16, 2009

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1. Quality Program

1A. General

Conduct all Work necessary to meet the requirements of this section, and satisfy all functional needs and characteristics of the Quality Program, including quality planning, Quality Control (QC), Quality Assurance (QA), and quality improvement.

1B. Standards

The Quality Program shall be conducted in accordance with this Quality section and the requirements of the standards listed in Table 1B-1 (Standards for Design-Builder Quality Program), unless otherwise stipulated herein.

1B - 1. Prioritization Table

TABLE 1B-1
STANDARDS FOR DESIGN-BUILDER QUALITY PROGRAM

Priority	*Author or Agency*	*Document Title*
1	ISO	ISO 9001:2000, Quality Management System - Requirements
2	ISO	ISO 9000:2005, Quality Management System - Fundamentals and Vocabulary
3	UDOT	*CADD Standards Manual*
4	UDOT	*Special Provisions*
5	UDOT	*Plan Sheet Development Standards*
6	UDOT	*Supplemental Specifications to 2008 Standard Specs for Road and Bridge Construction*
7	UDOT	*2008 Standard Specifications for Road and Bridge Construction*
8	UDOT	*Minimum Sampling and Testing Requirements* (current version)
9	UDOT	*Materials Manual of Instruction,* Part 8
10	UDOT	*Steel and Concrete Construction Manual – 2008*
11	UDOT	Materials Forms (current versions)

1C. Requirements

1C - 1. General

The Design-Builder is responsible for the quality of the Work, including products of designers, contractors, engineers, Subcontractors, fabricators, Suppliers, and vendors. The Design-Builder shall develop, implement, and maintain a Quality Program covering the Work, including management, administration, design, construction, maintenance of public and private facilities, geotechnical investigations, and environmental monitoring and compliance.

The Quality Program's procedures shall be documented in a Quality Management Plan (QMP).

The Design-Builder shall obtain the Department's Approval of the QMP in two stages. First, Approval of all non-construction related procedures and plans (Stage 1), and second, Approval of all construction-related procedures and plans (Stage 2).

The QMP shall delineate how the Design-Builder will ensure that all disciplines, aspects, and elements of the Work will comply with the requirements of the Contract Documents and that all materials incorporated into the Work will perform for the purpose intended.

The Department will deliver its Approval or disapproval and comment on each QMP submission within 15 Working Days following the Department's receipt of the QMP. After the QMP has been Approved, any revisions to the QMP, staffing levels, or key quality personnel shall require prior written Department Approval.

The QMP shall be approved and endorsed by the Design-Builder's senior management.

The QMP shall be in effect until the end of the Warranty term.

The Design-Builder shall revise its QMP within 10 Working Days upon notification by the Department of a systemic problem.

The hierarchical structure of the QMP shall follow the structure of the ISO 9001 standard.

1C - 2. Documentation

The Design-Builder shall establish and maintain its own document control system (DCS) to store and record all correspondence, design inputs, drawings, progress reports, technical reports, specifications, Contract Document requirements, submittals, calculations, test results, inspection reports, nonconformance reports, administrative documents, and other documents generated under the Contract Documents. The Design-Builder shall transmit electronic copies of the foregoing to the Department on an ongoing and timely basis.

The QMP shall describe the routing, filing, control, and retrieval methods for all documents.

The Design-Builder shall ensure that its DCS is compatible with the DCS used by the Department.

The QMP shall describe the methods by which all Project documents issued and received by the Design-Builder shall contain the following:

1. A unique serialization
2. Date issued or received
3. Project name
4. Specific subject or content of the correspondence
5. Name of sender and recipient
6. Reference information to which the correspondence relates, such as prior correspondence

The Design-Builder shall ensure that any changes to documents previously provided to the Department are in a format that can enable changes to be readily apparent and trackable (e.g., documents use the redline/strikeout method). The serialization of revised documents shall reflect the serialization of the original document.

QA staff shall maintain records to demonstrate conformity with all Contract Documents requirements. Records shall include manufacturers' certificates for all materials accepted by certification and the Department's "Approved for Shipment" certificates. QA staff shall transmit electronic copies of the foregoing to the Department on an ongoing and timely basis.

1C - 3. Responsibility, Authority, and Communication

The QMP shall describe all confirmation resources, such as auditors, verifiers, checkers, inspectors, and testers that the Design-Builder will utilize.

The Quality Assurance Manager (QAM) shall:

1. Have overall responsibility for success of the Quality Program.
2. Have no responsibilities in the production of the Work.

QC staff shall:

1. Be responsible for quality.
2. Only have responsibilities in the production of the Work and shall remain independent of the QA staff.
3. Have the authority to stop Work.

QA staff shall:

1. Be responsible for quality.
2. Provide a certified testing laboratory located within 20 miles of the Project Site.
3. Have no responsibilities in the production of the Work.
4. Be responsible for confirming and providing confidence that Work meets or will meet the contract requirements.
5. Be co-located at the Project offices.
6. Confirm all Work, unless confirmed by qualified individuals who are employees of or retained by manufacturers, vendors, or Suppliers, who are pre-Approved in writing by the Department.

Quality Oversight will review, assess and verify the Design-Builder's performance in complying with the contract requirements.

1C - 4. Management Review

The Design-Builder's executive management shall conduct a management review of the Quality Program at least quarterly, and more frequently if necessary or if requested by the Department, to ensure its continuing suitability and effectiveness in satisfying the requirements of the Contract Documents and the Design-Builder's stated quality policy and objectives.

The Department shall be invited to participate in the management reviews.

The management reviews shall assess, at a minimum, the results of internal audits, Department audit results, corrective actions taken, trends in nonconformance, and time to resolution.

The outputs of management reviews shall be incorporated into the Quality Program.

1C - 5. Human Resources

All QC and QA staff shall possess the necessary qualifications commensurate with the scope, complexity, and nature of the activity. Specific qualification requirements for materials inspection, sampling, and testing are indicated in Table 1C-1 (Certifications Required for Materials Inspection, Sampling, and Testing). Department-Approved testing firms shall be used. A list is available on the Department Web site.

The QC Manager (QCM) shall have no less than eight years experience in QC. The Construction QC Manager (CQCM) shall have no less than eight years experience in construction QC. The Design QC Manager (DQCM) shall have no less than eight years of design QC experience. The QCM, CQCM, and DQCM shall have or obtain within six months of NTP1, American Society for Quality certification as Quality Inspector, Quality Engineer, or Manager of Quality. The DQCM shall be a Utah-licensed professional engineer, or become licensed by the time of NTP2.

The PDA (Pile Driving Analysis) firm shall have a minimum of five years of experience in monitoring, testing, and analyzing pile driving using PDA testing and signal matching analysis for piling of types and sizes similar to that used on the Project.

The Design-Builder shall provide training to all personnel that interface with QA staff and the Department's Quality Oversight (QO) staff to ensure that they understand expectations, requirements, and their specific roles and responsibilities.

TABLE 1C-1
CERTIFICATIONS REQUIRED FOR MATERIALS INSPECTION, SAMPLING, AND TESTING

Material	*Qualification Requirement*
Field Technician for:	
Concrete Sampling and Testing	ACI Concrete Field Testing Technician; Grade I or UDOT TTQP Concrete Testing Technician
Aggregate Sampling and Testing	UDOT TTQP Aggregate Testing Technician; UDOT Sampling, Reduction and Density Testing Technician
Soils and Embankment Sampling and Testing	UDOT TTQP Embankment and Base Testing Technician; UDOT Sampling, Reduction and Density Testing Technician
In-Place Density Testing	UDOT TTQP In-Place Density Testing Technician
Asphalt Sampling and Testing	UDOT TTQP Asphalt Testing Technician; UDOT Sampling, Reduction and Density Testing Technician
Field Inspector for:	
Portland cement concrete (PCC) Paving and PCC Batch Plant	Three years of related experience and ACI Concrete Field Testing Technician, Grade I
Embankment	Three years of highway-related experience and UDOT TTQP Embankment and Base Testing Technician
Structural Concrete	Five years of highway-related experience and ACI Concrete Field Testing Technician, Grade I
Welding	Certified Welding Inspector (AWS D1.1)
Structural Steel	Five years of related experience and AWS-Certified Welding Inspector QC Inspector

TABLE 1C-1
CERTIFICATIONS REQUIRED FOR MATERIALS INSPECTION, SAMPLING, AND TESTING

Asphalt Hot-Mix Plant and Asphalt Paving	Three years of related experience
Precast/Prestressed Concrete	Three years of related experience and ACI Concrete Field Testing Technician, Grade I and PCI QC Personnel Certification, Levels I & II
Lab Technician for:	
Concrete	UDOT Laboratory Testing Technician; UDOT Concrete Strength Testing Technician
Asphalt	UDOT Superpave Mix Design Technician
Generic	UDOT Laboratory Testing Technician

ACI = American Concrete Institute; AWS = American Welding Society; PCC = Portland cement concrete; PCI = Precast/Prestressed Concrete Institute; TTQP = Transportation Technician Qualification Program.

1C - 6. Planning of Product Realization

The QMP shall document the Inspection and Test Plan describing all of the proposed inspections and tests to be performed throughout the construction process. The QMP shall include a procedure that standardizes the format and structures of documented processes, such as the Landscape Plan, Environmental Protection Program, Design-Build Aesthetics Plan, and Geotechnical Instrumentation Plan.

The Inspection and Test Plan shall include the following:

1. Describe all incoming, in-process, and final inspections and tests to be undertaken.
2. Show what products or services are to be subcontracted.
3. Be controlled through the provision of document control and be updated when new Subcontractor or Supplier contracts are implemented.
4. Identify the Control Points (Definition: The stages at which Work elements will be formally accepted by QA personnel prior to proceeding to the next stage of the Work element).
5. Describe confirmation of Suppliers' and Subcontractors' compliance with requirements.
6. Define the activity to be tested/inspected, the group/laboratory to perform the test/inspection, the frequency of test/inspection, the test/inspection procedure or reference standard, the specified requirement reference, and the record that documents the results.

Following are the minimum Control Points that shall be established:

1C - 6.1. Environmental Mitigative Measures

1. Before any construction occurs; after installation of Best Management Practices (BMPs) and environmental controls to confirm that they have been installed as designed by the Design-Builder's Environmental Control Supervisor and according specifications

1C - 6.2. Embankments

1. After completion of drainage and utility installations and before backfill
2. After all clearing, grubbing, and excavation

3. Per specifications for lift requirements (applicable to all embankments, including walls)
4. After completion of MSE wall panel placement every 10 vertical feet
5. At completion of embankment placement (to establish the settlement monitoring baseline)

1C - 6.3. Structures

1. Before placement of the leveling pad of an MSE wall or other type of retaining wall (to confirm subgrade materials)
2. At completion of bridge embankment settlement and before start of bridge foundation pile-driving
3. At Design-Builder's QA approval of pile driving submittals (including design calculations, wave analysis, and hammer)
4. After completion of pile-driving at each structure support (pile group), including pile-driving results and records
5. Before concrete placement of any substructure element, including pile infilling
6. After girder and diaphragm placement
7. Before concrete placement of deck, approach slabs, diaphragms, and parapets
8. Before beginning construction of box culverts (to confirm subgrade materials)
9. Before concrete placement for cast-in-place (CIP) retaining walls and box culverts; after rebar placement but before final form placement for CIP retaining walls and box culverts taller than 6 feet

1C - 6.4. Surfacing, Paving, and Concrete

1. Before placement of each course above subgrade on permanent roadways components (granular borrow, lean base, etc.)
2. Before placement of each lift of asphalt or PCC paving on permanent roadway components
3. Before any placement of concrete
4. Every 1,500 feet of slip-form barrier

1C - 6.5. Noise Walls

1. After completion of every 500 feet of noise wall posts or panels

1C - 6.6. Traffic Devices and Switches

1. Before opening to traffic

1C - 7. Customer-Related Processes

The Department will perform QO with a focus on obtaining confidence that the requirements of the Contract Documents have been met and identifying opportunities for improvement.

QO will occur via collection of objective evidence, (e.g. monitoring, auditing, reviews, interviews, inspections, tests, etc.) to assess the Design-Builder's performance in meeting the contractual requirements. This includes all parties subcontracted to the Design-Builder, including Subcontractors, Suppliers, fabricators, etc.

The results of QO will be documented on standardized report forms with copies provided to the Design-Builder.

QO results will also be recorded in a database, and regular summary and status reports will be provided to the Design-Builder. The timing, frequency, and depth of monitoring and QO will be at the Department's discretion.

Independent Assurance (IA) will include sampling and testing of QO, QA, and QC materials, testing, personnel, and methods, in accordance with Part 8 of the UDOT *Materials Manual of Instruction*.

1C - 8. Design and Development

1C - 8.1. General

All design shall meet the requirements of the ISO 9001 standard and this Section.

1C - 8.2. Design and Development Planning

The QMP shall meet the following requirements:

1. Describe the design (QC) and confirmation (QA) activities separately.
2. Describe how the design team schedules the design efforts, including design reviews; confirmation and checking stages; and issue dates of design submittals.
3. Identify the Control Points at which Work shall be formally accepted by QA personnel prior to proceeding to the next stage of the Work.
4. Describe the coordination of the design with construction.

1C - 8.3. Design and Development Inputs

The QMP shall describe how all design criteria, Contract Document requirements, and other design inputs are defined, reviewed, and approved.

The Design-Builder shall maintain an accessible, centrally controlled manual, database, or list that contains all relevant design inputs or reference to design inputs to be incorporated into the design by design personnel.

The Design-Builder shall ensure that the design inputs are communicated to, and accessible by, the relevant designers responsible for incorporating design inputs into the design outputs.

1C - 8.4. Design and Development Outputs

Submission requirements to agencies other than the Department shall be determined by and complied with by the Design-Builder.

The QMP shall define the design outputs (i.e., the specific plans and specifications) to be produced.

1C - 8.5. Design and Development Review

The Department shall be invited to a minimum of two separate reviews of the design during the development of each design package, prior to issuance of Released for Construction Documents.

At least one of the reviews for each package shall be conducted prior to 70 percent design progress. The reviews are not Control Points that restrict the progress of design. They are simply reviews of the design as it progresses and opportunities for the Department to provide comments and feedback on the design.

The QMP shall describe the frequency, timing, content, and format of these reviews.

1C - 8.6. Design and Development Confirmation

Records of design confirmation shall clearly indicate the design input, the design output that contained the design input, the method of confirmation, and the approver's name and function title.

1C - 8.7. Design and Development Validation

The QMP shall describe all confirmation, validation, monitoring, inspection, and activities to be carried out for the purposes of demonstrating that the Work is acceptable.

1C - 8.8. Control of Design and Development Changes

The QMP shall describe how changes to design inputs are identified, reviewed, and approved by authorized personnel prior to their implementation.

The QMP shall describe how changes to design outputs are categorized (i.e. minor versus major) and approved.

The QMP shall describe the method of communicating changes or revisions to the field.

1C - 9. Purchasing

Purchase the following products from Suppliers identified on the Department's Suppliers list, located on the Department Web site:

1. Portland cement
2. Flyash
3. Asphalt binder
4. Asphalt emulsion
5. Hydrated lime
6. Reinforcing steel
7. Pavement marking paint
8. Precast and prestressed concrete

QA staff shall maintain records of receipt of incoming materials and confirm compliance with specified requirements at the time of incorporation into the Work.

1C - 10. Production and Service Provision

The QMP shall describe the methodology for responding to Department concerns associated with the quality of the Work during the Contract Warranty term.

1C - 11. Control of Monitoring and Measurement Devices

Laboratories performing acceptance testing shall be accredited with the AASHTO Accreditation Program (AAP) and the UDOT Laboratory Qualification, as described in the UDOT *Materials Manual of Instruction*, Part 8.

Obtain AAP accreditation for all AASHTO and American Society for Testing and Materials (ASTM) test methods to be performed by the testing laboratory, by NTP2. Also obtain accreditation for AASHTO and ASTM test methods that are modified or referenced by Department test methods.

1C - 12. Monitoring and Measurement

Construction QA shall conduct sampling and testing of construction products in accordance with the minimum frequencies in the *Minimum Sampling and Testing Requirements* and the *Standard Specifications for Road and Bridge Construction*.

All reports of inspection and test activities shall meet the content requirements of any applicable Department forms and identify the following, at a minimum:

1. Name and quantity of items inspected/tested
2. Inspection/test procedure reference with organization and documented ID
3. Location of test and installation location
4. Date conducted
5. Name or stamp of inspector/tester
6. Observations/comments
7. Pass/fail requirements, including upper/lower limits when applicable
8. Results—acceptance or rejection, including actual readings, evaluation of results, and corrective actions

The QMP shall describe the Design-Builder's approach to ensuring the Department has opportunity to attend Control Point reviews.

The Department will develop, implement and maintain a Project acceptance database that will provide the current status of completion, compliance and acceptability of all elements of the Project. The database will assist in assessing performance of the Work, resolution of outstanding issues and acceptance of Project elements by the Department. The Design-Builder shall attend meetings and provide information that may be necessary to facilitate the development of an effective database. The Design-Builder shall enter all QA reviews, inspections, audits, confirmations, tests, punchlists, nonconformances, corrective/preventive action requests, and other information related to the completion, compliance and acceptability of the Work into the Department's Project acceptance database daily.

The Design-Builder shall respond to all Department design review comments, during design development through to Final Acceptance, regardless of whether they relate to contractually specified requirements.

QA shall conduct internal quality audits, for each element of the Quality Program, at least once every six months.

1C - 13. Control of Nonconforming Product

The Design-Builder's proposed resolution to Nonconforming Work cited by QO shall be documented in a format and medium acceptable to Department.

Following acceptance or Approval of the proposed resolution by the Department, the Design-Builder shall, when implementing the proposed resolution, provide the Department 24 hours notification so that the Department may witness the implementation, should the Department so choose.

Representatives of agencies of the federal government and representatives of other agencies of Utah shall have the right to inspect the Work to the same extent provided above for the Department and as required by governmental rules.

Resolutions to Nonconforming Work that propose deviation from contract requirements or repair shall be approved by the Engineer(s) of Record and the applicable QA manager, and Approved by the Department.

1C - 14. Analysis of Data

The QMP shall describe the approach to summarizing, analyzing and reporting monthly on the effectiveness and continued improvement of the Quality Program.

1C - 15. Improvement

The Design-Builder's proposed corrective and preventive actions to requests from the Department shall be documented in a format and medium acceptable to the Department.

1D. Submittals

Submittal	*For Approval*	*Schedule*
QMP Stage 1	Yes	See Part 1, Articles 4.2.1 and 14.3
QMP Stage 2	Yes	See Part 1, Article 4.2.2 and 14.3
Internal Audits	No	Within 14 days of completion
Management Review Meeting Minutes	No	Within 14 days of completion
Design Development review documents	No	5 days in advance of review
Hardcopies of Inspection and Test Reports	No	Prior to Final Acceptance
Electronic entry of monitoring and measurement results	No	Daily
Report on Quality Program performance	No	Monthly
AAP accreditation certificate(s)	No	Upon receipt by the testing laboratory.
Manufacturers' warranties, guarantees, instruction sheets, parts lists, and other	No	Prior to Final Acceptance

product data		

2. Program Management

2A. General

This section defines the Design-Builder's performance requirements and criteria for management and administration of the Work. The Design-Builder is responsible for management of the entire Project, coordination of all activities necessary to perform the Work, and for reporting and documenting all Work and any related requirements. The Design-Builder shall satisfy all functional needs and characteristics of Program Management, including Schedule Work Plan; Project Schedule(s); Schedule of Values; Monthly Progress Schedules; Invoicing and Payment; Facilities; Project Communications; Photographs; and Final Completion.

2B. Standards

Not used.

2C. Requirements

2C - 1. General

This Section describes the Project Schedule requirements to ensure that milestone dates will be met and completion of the Work will be accomplished within the Completion Deadlines established. The Department's opinions concerning the various scheduling documents and reports are not controlling Design-Builder's independent judgment concerning means, methods, and sequences of construction that the Design-Builder employs. The Design-Builder is solely responsible for meeting the Key Milestones, Completion Deadlines, and other Contract time(s) given in these Contract Documents.

All Work Activities of Design-Builder shall be scheduled and monitored by use of a cost loaded Critical Path Method (CPM) Project Schedule using the latest version of Primavera software (P6) unless otherwise Approved by the Department. Design-Builder shall provide a CPM Schedule and Schedule of Values (SOV) for Work in accordance with Sections 2C-1through Section 2C-5.

2C - 2. Schedule Work Plan

The Design-Builder shall provide a Schedule Work Plan that includes a Resouce Plan and assigns responsibilities for critical tasks and duties to positions within the Design-Builder's organization. These identified positions must include oversight, review, QA, QC, and the chain-of-command for approvals. The Work Plan should include workflows for how the Project Schedules and Monthly Progress Schedules are to be developed, maintained, and approved by the Design-Builder's management and how the Design-Builder will coordinate with the Department for reviews. The workflow should include internal meetings/workshops, production time, reviews, QA, Department over-the-shoulder reviews, and monthly update reviews in relation to the various Project Schedules and Monthly Progress Schedule due dates. The Work Plan should include the processes for all Project schedules, excluding the Proposal Schedule.

This Work Plan shall be submitted for Approval with the Original Baseline Schedule submittal as a condition precedent to issuance of NTP1.

2C - 3. Project Schedules

Project Schedule shall mean any of the following Schedules identified in this section 2C-3.

2C - 3.1. Proposal Schedule

The Proposal Schedule shall be submitted with the Final Proposal and Price Allocation. It shall incorporate the Project Completion Deadlines, the dates for which shall not be changed except by Change Order; and establish other Key Milestones, the dates for which shall not be changed except by Department Approval. Key Milestones include: i) NTP1 and NTP2. The Proposal Schedule shall show the Design-Builder's plan for the Work and all Activities necessary to complete the Project at a summary level from NTP1 through Final Acceptance and which is anticipated to contain between 200 and 600 Activities. The summary level Activities shall be cost-loaded consistent with the Proposal Price Allocation Form. The Proposal Schedule shall be the basis for all subsequent Project Schedules.

2C - 3.2. Original Baseline Schedule

The Original Baseline Schedule shall be based upon the Proposal Schedule and shall include the Completion Deadlines and Key Milestones on the dates set by the Proposal Schedule. The Original Baseline Schedule shall be the Design-Builder's original plan for the Project from NTP1 through Final Acceptance and shall show detailed Activities for all Work authorized by NTP1 sufficient to plan, monitor, and evaluate the progress of the Work. The Original Baseline Schedule shall be used to determine payment amounts for all Work authorized by NTP1. The Original Baseline Schedule shall be replaced with the Approved Project Baseline Schedule. The Original Baseline Schedule must be Approved by the Department. The Original Baseline Schedule shall represent conditions of the Project at NTP1 and shall not be modified to reflect progress from NTP1 through Original Baseline Schedule Approval. Activities authorized by NTP1 are subject to a 30-day maximum duration, and $10,000 minimum amount. Once Approved, this schedule shall become the Baseline Schedule against which progress shall be measured and payment amounts measured for all Work authorized by NTP1. The Original Baseline Schedule shall not change after Approval.

2C - 3.3. Project Baseline Schedule

The Project Baseline Schedule shall be derived from the Original Baseline Schedule and shall include the Completion Deadlines and Key Milestones on the dates set by the Proposal Schedule. The Project Baseline Schedule shall represent the then-current plan for performing the Work, shall detail all Activities authorized by NTP1 and NTP2, shall represent conditions of the Project at NTP2, but shall not be modified to reflect progress of Activities authorized by NTP2.

Once Approved, the Project Baseline Schedule shall become the Baseline Schedule against which all progress shall be measured and payment amounts determined. The

Project Baseline Schedule shall not change after Approval except as provided by this Section 2C. The Project Baseline Schedule shall be the basis for the Monthly Progress Schedule by the Design-Builder in its scheduling and performance of the Work.

Activity durations for Work authorized by NTP2 are limited to a 20-day maximum duration. The Approved Schedule of Values (SOV) for NTP2 shall not change without prior Approval.

2C - 3.4. Revised Baseline Schedule

If significant changes to the Project Schedule are necessary or have been made over time, such as from Approved Change Orders, the Design-Builder may propose a Revised Baseline Schedule be developed. Any Revised Baseline Schedule is subject to the Approval of the Department. Each Revised Baseline Schedule shall have a unique name that includes a sequential revision number. This schedule will not show progress but shall maintain the original data date from the Original Baseline Schedule as a baseline.

Once Approved, this schedule shall become the Baseline Schedule for the Project against which all progress and revisions shall be measured.

2C - 3.5. Recovery Schedule

The Recovery Schedule is defined as the Design-Builder's program and proposed plan for the recapture of lost schedule progress and to achieve the Project Completion Deadlines. The Recovery Schedule shall be based on the latest Monthly Progress Schedule and shall include equivalent detail. The Recovery Schedule shall show the proposed changes to the schedule; include cost loading and additional detail to substantiate the recovery plan; and shall reflect all proposed changes to the Activities in the lowest level of the Work Breakdown Structure (WBS) through Project Completion. The Department will notify the Design-Builder within 14 days after receipt of each such Recovery Schedule whether the schedule is Approved or describing changes that the Department believes should be made to the schedule. The Design-Builder shall incorporate and fully include the Recovery Schedule (including the Department's comments) into the next scheduled Monthly Progress Schedule (or, if the next scheduled Monthly Progress Schedule is due within seven days of Approval of the Recovery Schedule, then the Recovery Schedule shall be incorporated into the subsequent Monthly Progress Schedule).

Included with the Recovery Schedule the Design-Builder shall include a report that shows how their Resource Plan is to be modified to facilitate the Recovery Plan.

Design-Builder shall provide additional labor, equipment, and/or materials, work additional shifts, or expedite procurement to complete Activities within the Project Completion Deadlines at no additional cost the Department. Upon Approval of the Recovery Schedule by the Department, Design-Builder shall incorporate the Recovery Schedule into the current Project Schedule.

Design-Builder's refusal, failure, or neglect to take appropriate recovery action or to submit a written recovery statement shall constitute reasonable evidence that Design-Builder is not prosecuting the Work, or separable part, with the diligence that will ensure its completion within the applicable Contract time. Such lack of action shall constitute sufficient basis for the Department to recommend the withholding of some or all of any payment due, or shall be considered grounds for termination by the Department.

2C - 4. Monthly Progress Schedule

The Monthly Progress Schedule shall show actual progress against the Project Schedule Baseline Schedule, as applicable, and the planned execution for the remainder of the Project. Monthly Progress Schedule updates shall accurately represent all planning changes, adjustments, or updates in the sequencing and timing of Work remaining that have been made or are required to be made to ensure that the schedule stays current with the Design-Builder's plan for completing the Work. The Design-Builder may include modifications, such as adding or deleting Activities or changing activity durations or logic, that do not (1) alter the Critical Path or any Near Critical Path, (2) change the Completion Deadlines (3) change any Key Milestones, or (4) disrupt the integrity or comparative relationship between the Project Schedule and the Monthly Progress Schedule update. Any changes must conform to Section 2C-5. Notwithstanding the foregoing, no changes may be made to a cost-loaded activity (which will change the SOV) without the Department's Approval. If the Department provides comments to any Monthly Progress Schedule, the Design-Builder shall address such comments to the Department's satisfaction prior to submittal of the subsequent Monthly Progress Schedule. The Monthly Progress Schedule shall include all information current as of the data date.

2C - 4.1. Record Schedule

The last Monthly Progress Schedule submitted shall be identified by the Design-Builder as the Record Schedule. The Record Schedule shall reflect the exact manner in which the Design-Builder executed the Work (including start and completion dates; Activities; actual durations; sequences; and logic), and shall be signed and certified by the Design-Builder's Project Manager and the Design-Builder's Project Scheduler as being a true reflection of the way in which the Work was executed at the time of Project Completion.

2C - 5. Project Schedule Requirements

Project Schedules include the Proposal Schedule (as required by the ITP), Original Baseline Schedule, Project Baseline Schedule, Revised Baseline Schedule(s), and Recovery Schedule(s) (if any). Reference hereinafter to Project Schedule shall be any of the above, as determined by its use in context. If any ambiguity exists, which Project Schedule is meant shall be determined by the Department.

The time difference between the Early Finish date and the Late Finish date shall be defined as "Total Float." "Float" is defined as the amount of time between the early start date and the late start date, or the early finish date and the late finish date, for each and

every Activity in the schedule. All Float shall be shown on the Project Schedule on each schedule path. Critical Activities shall be defined as Activities with a total Float less than one day. Near Critical Activities shall be defined as Activities with a Total Float of less than 20 days. Suppression or consumption of Float by extended activity durations, dummy Activities, or preferential sequencing shall not be allowed. The Float belongs to the Project and may be used by the Design-Builder or the Department, except that any delays to an Activity due to weather delays during the winter season (November 15 to April 15) may not consume Float. Changes or delays that influence Activities in the network with Float and do not extend the Critical Path (the sequence of Activities with zero days Float) shall not be justification for an extension of any Completion Deadline.

The Design-Builder shall allow for three over-the-shoulder reviews or workshop sessions with the Department during development of the Project Baseline Schedule and at least one for each Revised Baseline Schedule. For all Monthly Progress Schedules, the Design-Builder shall meet with the Department as requested.

In all Project Schedules and Monthly Progress Schedules, the Design-Builder shall perform the following:

1. Include the following data for each Activity:
    a. Activity ID
    b. Activity Description
    c. Start Date (actual start date for started Activities)
    d. Finish Date (actual finish date for completed Activities)
    e. Remaining Duration
    f. Current projected early/late start/finish dates (for Activities not started)
    g. Current early/late finish dates (for uncompleted Activities)
    h. Total Float
    i. Critical Path Activities noted
2. Ensure that the actual number of Activities in the schedule is sufficient to assure adequate planning of the Work and to permit monitoring and evaluation of progress and the analysis of time impacts.
3. Use the CPM to determine controlling operations. The Design-Builder shall utilize retained logic for calculating all schedules Out-of-sequence Work shall be discussed at the monthly review meeting.
4. Show the order in which the Design-Builder plans to perform the Work with logical ties sufficient to show the Design-Builder's overall approach to the planning, scheduling, and execution of the Work.
5. Ensure that no Activity shall have total Float greater than 60 days unless otherwise Approved by the Department.
6. Ensure that durations and logical relationships shall be based on the actual durations and relationships anticipated.

7. Depict the sequence and interdependence of Activities required for complete performance of the Work beginning with NTP1 and concluding at Project Completion.
8. Ensure that all Activities shall be consistent with the Work Breakdown Structure.
9. Identify all design packages intended to be released for construction, including for each Segment of the Work. At a minimum, all design packages shall have logic ties to the construction Work contemplated in that design package.
10. Show the phasing of the Work, including Segments; Released for Construction Documents; submittal dates; Subcontractor Work; procurement; fabrication; preparation of mock-ups; delivery; installation; testing of materials and equipment; and any long-lead-time (over 60 days) orders for materials or equipment.
11. Include the Completion Deadlines set forth in the Contract. Only Key Milestones and Completion Deadlines shall be included as constraints.
12. Depict the required coordination with and Work to be performed by other contractors, Utility Owners, Governmental Persons, railroads, levee districts, Departments, architects, Subcontractors, and Suppliers. Account for and show permits.
13. Ensure that all Activities of the Department or third parties that affect progress of the Work shall be shown.
14. Ensure that no construction Activity duration shall be shorter than 1 day or longer than 30 days without prior Approval.
15. Provide a graphic representation of all Activities necessary to complete the Work (Gantt Chart with Activity table).
16. Show Maintenance of Trafiic (MOT) Activities.
17. Ensure that Activities Costs are loaded at the Activity level and are not loaded in any summary function. Cost must be able to be rolled up into the Price Allocation breakdown represented by the Price Allocation Form.
18. Ensure that no unspecified milestones, Float suppression techniques, or use of Activity durations, logic ties, and/or sequences deemed unreasonable by the Department shall be used in the Project Schedules.
19. Set the default Work calendar with a five-day Work week and official State holidays.
20. Use Activities or calendars instead of duration lags.
21. Ensure that no Activity numbers are reused. A system shall be pre-Approved to verify that this requirement is being followed. A unique number must be assigned to all Activities (if using multiple schedules).
22. Ensure that Activity descriptions (scope) are not changed. A new Activity shall be used to show change in scope.

2C - 5.1. Schedule Narrative Report

Design-Builder shall prepare and include with its Original Baseline Schedule submission a schedule narrative report describing the contract requirements and objectives and Design-Builder's plan and schedule for achieving those requirements and objectives. The narrative shall describe the methods of operation, the resources to be employed, time frames for the construction of each of the major items on the Project, and time frames for

accomplishment of the specified milestones and Project Completion Deadlines. A Resource Plan shall be included. It shall breakout the resources needed to execute the contract and will include (not inclusive) Work crews, critical equipment, specialized personnel, Work shifts, and subconsultants. The Resource Plan may be incorporated into the schedule.

A cashflow report shall be included to show costs by month. This report shall be generated by Primavera. Logic/duration revisions shall be described and listed, including the following, as applicable:

1. Addition and deletion of Activities
2. Addition and deletion of relationships
3. Changes to relationship types and lag codes
4. Changes to contract milestone dates and Approved constraint dates
5. Changes to dollar values resulting from Approved Change Orders
6. All other revisions to the network logic

2C - 5.2. Time Impact Analysis for Change Orders, Delays, and Time Extensions

When a Request for Change Proposal (RCP) is issued by the Department that may impact the schedule, or if a Potential Change Order (PCO) is submitted by the Design-Builder that asserts a delay, the Design-Builder shall include a Time Impact Analysis (TIA) illustrating the influence of each event of delay on the Project Schedule as a whole and for any specified Completion Deadline. Each TIA shall include a fragnet demonstrating how the Design-Builder proposes to incorporate the change(s) or delay(s) into the current Baseline Schedule. The fragnet shall include all logic changes and additions required as a result of the matter described in the RCP or PCO.

2C - 5.3. Integration with Right-of-Way Schedule and Activities

The Design-Builder shall not start Work on any parcel identified in the Right-of-Way Plans or Right-of-Way Schedule until access is provided by the Department. The Deisgn-Builder shall accommodate any changes to the ROW Schedule in its Project Schedule in accordance with Part 1, Section 9.

2C - 6. Schedule of Values

2C - 6.1. General

The Schedule of Values (SOV) includes the Original Schedule of Values and the Project Schedule of Values. Reference hereinafter to SOV shall be either of the above, as determined by its use in context, however, if any ambiguity exists, which SOV is meant shall be determined by the Department.

The Schedule of Values is the Cost Loaded Project Schedule. The Schedule of Values is a detailed itemized list that establishes the value or cost of each detailed part of the Work. The Design-Builder shall allocate the Contract Amount in the SOV consistent with the Proposal Price Allocation Form. The SOV shall attach costs to those Project Activities for which the Design-Builder desires to be paid. The SOV shall show a detailed

breakdown of quantities, labor, materials, equipment, and other costs used in preparation of the Proposal Price Allocation Form for each Activity in the Project Baseline Schedule. The Project SOV shall include separate pay items for mobilization and unincorporated materials. The Project SOV shall show the purchase and delivery costs for materials and equipment that the Design-Builder anticipates it shall request payment for prior to their installation. The Project SOV shall include a separate pay item for all allowances and utilities, for scheduling, maintaining as-builts, and single pay item for the following items:

[List is **TBD**]

The Design-Builder shall submit a SOV for Approval with the Original Baseline Schedule and with the Project Baseline Schedule according to the following:

1. For the Original Baseline Schedule, provide costs for those detailed Activities authorized by NTP1 for which the Design-Builder desires to be paid.
2. For the Project Baseline Schedule, provide costs for those detailed Activities authorized by NTP2 for which the Design-Builder desires to be paid and combine them with those Activities in the Original Baseline Schedule SOV.

No value for any Activity shall be modified without prior Approval of the Department.

Except for those Activities otherwise identified herein or in Part 1, Section 14, the Schedule of Values shall be prepared to a level of detail so that the average value of an NTP2 Activity is $100,000 with no Activity value less than $10,000 or greater than $1,000,000, without prior written Approval by the Department.

When requested by the Department, support values with data that will substantiate their correctness. The Department may review the Escrowed Proposal Documents in order to substantiate the values shown in the SOV prior to Approval. The sum of the individual values shown on the Schedule of Values shall equal the total Contract Amount.

Each SOV item shall include a directly proportional amount of Design-Builder overhead and profit. The Contract Amount shall be allocated to accurately reflect the Design-Builder's cost for such Activity and shall not artificially inflate, imbalance, or front-load items.

SOV payment shall be for 100 percent completed Activities only.

All cost shall be categorized as labor, non-labor, and materials resources (Primavera Resource Categories). Costs may be broken down further by cost accounts which are to be used to assign prices to schedule Activities. Prior to NTP2, the Design-Builder shall meet with the Department to demonstrate their conversion of the Bid Price to the SOV structure.

2C - 7. Progress, Invoicing, and Payment

2C - 7.1. Progress Payment Calculations

[This Section **TBD]**

2C - 7.2. Invoices

[This Section **TBD]**

2C - 7.3. Progress reports

1. The Design-Builder shall include the following in the monthly progress reports:
    a. Monthly Progress Schedule
    b. Schedule Narrative Report
    c. Project Schedule of Values
    d. Milestones achieved during the period
    e. Summary of Project accidents (frequency and severity) and corrective actions taken
    f. Progress photographs
    g. The total monthly labor hours for construction/maintenance and non-construction personnel by classification of management, engineering, and other technical personnel used on the job
2. With each monthly progress report, the Design-Builder shall provide a certificate signed by the Quality Assurance Manager certifying the following:
    a. All Work, including that of designers, Subcontractors, Suppliers, and fabricators, has been checked and/or inspected by the QA staff and that all Work, except as specifically noted in the certification, conforms to the requirements of the Contract
    b. Records that provide evidence of compliance with Contract requirements are available
    c. Nonconformances are being documented and resolved
    d. Significant systemic problems are being investigated and actions taken to prevent their reoccurrence
    e. Submittals are verified to meet all requirements prior to delivery and request for payment
    f. The Quality Manual and all of the measures and procedures provided therein are functioning properly and are being followed

2C - 7.4. Certification for Periodic Payment

[This Section **TBD]**

2C - 8. Facilities

[This Section **TBD]**

2C - 8.1. Segment Management Staff Facilities

Provide the following items and features for the required office space and facilities within 45 days after NTP1:

1. Office furniture for the entire office space
2. Digital photocopy machine with print, fax, and copy capabilities that produces at least 45 pages per minute (ppm)
3. At least eight outside telephone lines, with at least one line dedicated to facsimile transmission service
4. A T-1 network line between the Project management staff offices and the Department Region Headquarters and Complex
5. Office space for the Department's Project management staff that has, at a minimum, the following:
    a. eight offices (150 square feet, each enclosed office space with individual locking door)
    b. six cubicles (100 square feet each)
    c. One enclosed conference room (400 square feet)
    d. Break room with sink (150 square feet, with 12 square feet of counter space and a 20-cubic-foot refrigerator)
    e. Lockable filing space (400 square feet)
    f. Two lockable closets (25 square feet each)
    g. An appropriate number of desks, chairs and filing cabinets
    h. Two licensed copies of Primavera (P6)
    i. Hard-surfaced (paved) parking, with one space per office plus 10 visitor spaces

2C - 8.2. Department Segment Staff Facilities

Provide facilities for the Department's construction Oversight staff to co-locate with the Design-Builder's Superintendent(s) and the Quality Assurance field staff. In addition to the above requirements, provide the following:

1. Office space not less than the size indicated below:

a. One field office (enclosed with locking door) for the Segment Oversight Manager (150 square feet)
b. Six field offices for other construction Oversight staff (100 square feet each)
c. One enclosed conference room (200 square feet)
d. One lockable space for filing at each field office (200 square feet)
e. Clean inside storage space for equipment (80 square feet)
f. Outside shed for small tools and equipment (144 square feet)

2. Office furniture for the entire office space, including an appropriate number of desks, chairs, and filing cabinets
3. New digital photocopy machine with print, fax, and copy capabilities that produces at least 45 ppm
4. A well-graded site for the office with access road, parking area, and security fence with lockable drive-in gates that enclose the office and parking area
5. A parking area for at least 10 vehicles that is reasonably level. The parking area shall have an all-weather surface and shall include all-weather access and an all-weather level surface outside the security fence to accommodate visitor parking (approximately 2,000 square feet)
6. A 24-hour security service or silent watchmen-type security system
7. Sufficient exterior security lighting that is automatically activated at low-light levels to maintain two foot-candles of lighting within the fenced field office site

Provide the segment staff facilities at least 15 Working Days prior to starting Work on the Work Activity to be covered by occupant staff.

2C - 9. Project Communications

2C - 9.1. Project Directory and Organization

2C - 9.1.1. Directory

Provide a directory showing all Key Personnel identified by function within 15 Working Days of NTP1. The directory shall be updated throughout the course of the Project to remain current and, at a minimum, a revised directory shall be submitted within five Working Days of NTP2. The directory shall include the following information for each person listed: (1) Project title, (2) area of responsibility, and (3) office location. For each person identified, provide the following: (1) e-mail address, (2) mobile telephone number, (3) fax number, and (4) office location. For offices identified, provide the following: (1) office address and location, (2) main office telephone number, and (3) fax number.

2C - 9.1.2. Organization

Provide an organization chart within 15 Working Days of NTP1. The organization chart shall be updated throughout the course of the Project, but no less than at NTP2 and at the start of any new Project Segment. The organization chart shall, at minimum, identify the personnel whose responsibilities include the following functions:

1. All Key Personnel
2. All QA positions
3. All QC positions
4. Environmental Compliance
5. Subcontracts and procurement
6. Design for each discipline
7. Coordination for each third party, including Utilities, Railroad, and other Agencies
8. Safety
9. Project Controls
10. Public Information

2C - 9.2. Project Meetings

The Design-Builder shall plan for weekly and monthly meetings with the Department to discuss Project progress, issues, and all planned Work, including that authorized by NTP1 and NTP2. The types of and topics for meetings shall be mutually developed by the Design-Builder and the Department. The Design-Builder shall prepare and distribute agenda and meeting minutes for all regular meetings. All meeting minutes shall not become final until the Department reviews and provides comments to the minutes, which shall be included in the meeting minutes. The Design-Builder shall provide all meeting facilities unless otherwise agreed.

2C - 9.3. Network Requirements

Establish the communications systems necessary to control all aspects of the Project and to maintain communication with the Department and other State and local agencies.

2C - 9.4. IT Hardware/Infrastructure

[This Section **TBD]**

2C - 9.5. Electronic Communications

The Design-Builder shall perform the following:

1. Utilize an e-mail and calendaring solution that adheres to the iCalendar standard.
2. Establish and maintain network connections sufficiently robust to support efficient access to and implementation of all specified desktop and/or internet-based applications, databases, and/or repositories.

2C - 9.6. Submittals Requirements

Submittal of documents described in the General Provisions and other Contract Documents shall conform to the requirements described in this Section and the applicable Sections of the Contract Documents. Any document required to be submitted is considered a “Submittal” for the purpose of this Section. The Design-Builder shall perform the following:

1. Provide the Department the Design-Builder's document management structure for the Project and the ability to access any pertinent Project-related documents on an as-requested basis.
2. Submit all Submittals to the Department's Project Director or as directed in writing by the Department's Project Director.
3. Submit all Submittals in electronic format with six hard copies, unless otherwise specified in the Contract Documents.
4. Submit a letter of transmittal with each Submittal. If data for more than one Section of the Specifications is submitted, a separate transmittal letter shall accompany the data submitted for each Section.
5. Submit duplicates of all letters of transmittal.
6. If a Submittal deviates from the requirements of the Contract Documents, the Design-Builder shall specifically note each variation in the letter of transmittal.

Unless otherwise specified in the Contract Documents, the Department will respond to Submittals submitted for Approval within 30 days.

2C - 10. Photographs

2C - 10.1. Progress Photographs

Design-Builder shall take monthly aerial Project photographs of the Work and Site. Aerial photographs shall include all areas under construction, whether temporary or permanent, and all other areas impacted, each time they are taken. One oblique photograph shall be taken from each cardinal direction (north, south, east, west). The Department's confirmation shall be sought regarding views to be taken and the approximate time at which they will be taken.

Provide a complete set of aerial photographs monthly. Furnish additional photographs or prints requested by the Department at cost. Aerial photographs shall be at least 20-by-24 inches, standard weight prints with a satin finish. All photographs shall be provided in high quality digital format. The file format shall be .jpg, .gif, or .tiff and be provided on DVDs.

Provide interior and exterior photographs of each buried structure just prior to burial. Provide a minimum of four internal views (as applicable) and four external views of each structure. Place the following information on the back of each print and on front for digital photographs:

1. Date photograph was taken
2. Title of Project
3. Description of view shown in photograph
4. Identification of photographer
5. Sequential number of photograph

2C - 10.2. Pre-Construction Photographs

The Department has conducted a pre-construction survey, which includes photographs and video, but is not comprehensive. The Department will make those photographs and video available to the Design-Builder. The Design-Builder shall take a sufficient number of pre-construction photographs and a high quality video of the site in HD format so as to resolve any disputes which may arise regarding the considerations prior to and subsequent to construction.

If a dispute arises where no pre-construction photographs were taken and no other photographic evidence is available, the disputed area shall be restored to the extent directed by the Department at no additional cost to the Department.

2C - 11. Final Completion

TBD

2D. Submittals

Submittal	*For Approval*	*Schedule*
Payment Requests	No	Fifth day of each month (if this is a Holiday, a Saturday, or a Sunday, submit on the next Working Day)
Monthly Progress Reports	No	With Payment Request
Meeting Agenda	No	At least two Working Days prior to meeting
Meeting Minutes	No	Within three Working Days of meeting
Original Baseline Schedule	Yes	Immediately after execution of the Contract and as a condition precedent to issuance of NTP1
Project Baseline Schedule	Yes	A condition precedent to issuance of NTP2
Revised Baseline Schedules	Yes	No later than 30 days prior to the start of any Segment after with substantial Approved cost or schedule changes
Monthly Progress Schedules	Yes	With Monthly Progress Report
Recovery Schedules	Yes	Within 14 days after Monthly Progress Schedule shows delay to Completion Deadline of 20 or more Working Days

Record Schedule	No	Prior to Project Completion
Schedule Narrative Reports	Yes	With Original Baseline Schedule and Monthly Progress Report
Work Breakdown Structure	Yes	Prior to NTP1
Original Schedule of Values	Yes	As a condition to NTP1 and with Monthly Progress Reports until Approval of NTP2.
Project Schedule of Values	Yes	As a condition of NTP2 and with Monthly Progress Report
Progress Photographs	No	With Monthly Progress Report
Pre-Construction Photography	No	Prior to any construction or site investigations

3. General Design Requirements

3A. General

Conduct all Work necessary to meet the requirements of this section, and satisfy all functional needs and characteristics of the General Design Requirements, including Situation and Layout Plans; Released for Construction Documents; Final Design Documents; As-Built Documents; and Computer Software.

3B. Standards

Not used.

3C. Requirements

3C - 1. Situation and Layout Plans

Provide Situation and Layout plan sheets for all bridges, box culverts and rigid frame drainage structures, retaining walls, and noise walls, in accordance with the Situation and Layout Checklist in *Structures Design and Detailing Manual*.

3C - 2. Released for Construction Documents

Released for Construction Documents shall constitute the documents issued for the purposes of construction.

All Released for Construction Documents shall meet the following requirements:

1. Design all Work, including modifications to the Work, under the direct supervision of a Utah-licensed professional engineer.
2. Indicate the timing of submission of these documents in the Project Schedules.
3. Prepare plans similar in appearance and content to the UDOT *Plan Sheet Development Standards* and *Structures Design and Detailing Manual*. Variations are anticipated as a result of Design-Build delivery. Meet with the Department to obtain Approval of any variations in plan content and format.
4. Prepare all drawings in accordance with standard Department border and title block on all plan sheets. Replace the State Engineer signature with the signature of the Design-Builder's Engineer(s) of Record. Supplier-detailed drawings may use the Supplier's border and title block.
5. Ensure that all submittals containing CADD data are in a MicroStation format. This shall include CADD data received from other agencies.
6. Organize all CADD drawings, design files, and associated documents in a logical manner, with a uniform and consistent appearance, and clearly depicting the intention of the design and construction.
7. Show quantities for the purpose of materials testing.
8. Develop all designs and drawings in English units.

9. Use electronic signatures.
10. Use 11-by-17-inch sheets in PDF format.

3C - 3. Final Design Documents

Final Design Documents shall meet the requirements of the Released for Construction Documents and the following additional requirements:

1. Shall be fully completed Design Documents, except for necessary field design changes, for a geographic area organized by discipline.
2. Include design information from the most current version of Released for Construction Documents and all design back-up information, including design plans, shop drawings, calculations, reports, specifications, and electronic MicroStation data.
3. Be signed and sealed by a professional engineer licensed in the State.
4. For all calculations perform the following:
    a. Include the calculation title; file number; page number; initials of the designer and the checker; and dates of design and checking in all title blocks.
    b. Include Seismic Strategy Memorandum, if applicable.
    c. List any deviations from Project design criteria.
    d. Include documentation, including program name, vendor, version, and release date. Include Bridge Load Rating Report, if applicable.
    e. Indicate the design requirement, the assumptions made, the methods used, the source of the information, and the cross-reference for the applicable design drawings.
    f. Independently check all structure calculations and bridge rating calculations performed using software.
    g. Confirm hand calculations.
    h. Keep readily accessible, clear, understandable, concise, complete, and accurate.
    i. Bind and number with a table of contents.
    j. Identify the code or standard utilized and indicate the specific section referenced.
    k. Reference computer program name, vendor, version and release date, with appropriate code section indicated.
    l. Ensure all manual calculations are printed, neatly and legibly, on 8½-by-11-inch or 11-by-17-inch standard computation sheets.
5. For each bridge, provide an as-built plan file. This plan shall be a coordinate-correct plan, in accordance with horizontal datum requirements, representing the actual coordinates of the outside edge of deck, gutter lines, beam centerlines, substructure footings, abutment bridge seats, wingwalls, and other items identified in the Situation and Layout Plans. The file name extension shall include .ASB.

3C - 4. As-Built Documents

As-Built Documents shall meet the requirements of the Final Design Documents and reflect the actual condition of the final constructed Work.

3C - 5. Computer Software

The Design-Builder shall maintain compatibility with the Department's software/applications as updates or patches necessitate throughout the duration of the Project. Design-Builder shall supply two Primavera Client licenses for the Department's use. Design-Builder shall supply and use the following software:

Office Software

1. Microsoft (MS) Office Suite (PowerPoint, Publisher, Word, Excel)
2. Primavera Project Management, version 6.2.

Public Involvement

1. Adobe (Photoshop, Illustrator, Acrobat)
2. CommentSense by NorthGlide (via the Web site)

Roadway

1. MicroStation V8 XM by Bentley Systems Inc.
2. InRoads V8.9 by Bentley Systems Inc.
3. MicroStation Power Scope by Bentley Systems Inc. (for viewing CADD files)
4. AutoTurn by Transoft Solutions Inc.

Drainage

1. HEC-RAS—Backwater/Surface Water Analysis and Bridge Opening Scour Computations
2. HY-8—Culvert Analysis and Energy Dissipation Computations
3. HY-22—Pavement Drainage Analysis
4. Inroads Storm & Sanitary or StormCAD—Storm Drain Analysis
5. WMS, Flood Hydrograph Package

Pavement Design

1. DARWin (AASHTOware), which shall be the standard; an alternate software program may be used, but check the results using DARWin and submit the results to the Department for review and concurrence.
2. PAS—Pavement Analysis Software by American Concrete Pavement Association

Geotechnical

1. Unipile, L-Pile, COM624, FLPIER, Driven, GRLWEAP—Structure Foundations Design
2. QPRO, Drilled Spreadsheet
3. UniSettle, PCSTABL, XSTABL, STABL5M, STABL6, UTEXAS, Digitilt—Embankment Design and Landslide Analysis
4. FLAC—Geotechnical Modeling
5. CRSP—Rockfall
6. GoldNail—Soil Nail Design
7. CAPWAP—Pile-Driving Analyzer, with a full computer graphics package by Globle, Rausche, Likens and Associates

Structural Design

1. ABUD, Version 3.1.0, March 1995—Abutment Design
2. BSDI, Version 2.1, 1987—Steel Bridge Design
3. COMSPAN LA, Version 1.0, 2000—Prestressed Concrete Girder Design
4. FAD, Version 3.1.1, February 1996—Footing Design
5. GROUP, Version 3.0 & 5.0, 1994, 2000—Pile Group Lateral Load Analysis
6. GT STRUDL, Version 25, 2000—Finite Element Analysis
7. LARSA, Version 5.1, 1998—Finite Element Analysis
8. LPILE (+/WINDOWS), Version 4.0, 2000—Pile Lateral Load Analysis
9. MDX, Version 2.52t—Steel Bridge Design
10. PCACOL, Version 3.00, 1999, RECOL, Version 3.2.0, 1999, and WINRECOL, Version 4.0.0, 2000—Reinforced Concrete Column Design
11. SEISAB, Version 4.1.0, 1994—Bridge Seismic Analysis
12. WINFOOT, Version 1.00, 2000—Footing Design
13. XSECTION, Version 2.1.1, 1995—Reinforced Concrete Section Analysis

Lighting

1. AGI32 or Lumen Micro 2000

Traffic

1. CUBE 5 (particularly the Cube Base and Cube Voyager modules) by Citilabs, running version 6.0 of the WFRC/MAG Regional Travel Demand Model - High-level MOT plan development/screening; develop subarea trip tables for use in Paramics; develop intersection turning movements for use in Synchro or VISSIM
2. Quadstone Paramics ver. 6.5.3—macro-scale simulation/corridor-wide peak hour analysis of MOT plans (including signal operations)
3. VISSIM ver. 5.10-06—microsimulation and analysis of complex interchange types, closely-spaced intersections, queuing, weaving areas, and ramp metering; video animations
4. Synchro Studio 7, Synchro module—traffic signal optimization and coordination
5. HCS+, ver. 5.21—highway capacity analysis of mainline, weaving areas, and ramp junctions

Automated Traffic Management System and Maintenance of Traffic

1. ArcGIS (by ESRI)

Statistical Analysis of Material Testing

1. Microsoft Excel

3D. Submittal Table

Submittal	*For Approval*	*Schedule*
Preliminary Bridge Plans along with Bridge Foundation and Hydraulic Design Recommendations	No	Prior to submission of Release for Construction Documents
Release for Construction Documents	No	Prior to construction
Final Design Documents	No	At completion of all design development
As-Built Documents	No	Prior to Final Acceptance